

What is claimed is:

1    1.    A method for performing array microcrystallizations to determine  
2    suitable crystallization conditions for a molecule, the method comprising:  
3       forming an array of microcrystallizations, each microcrystallization  
4    comprising a drop comprising a mother liquor solution whose composition  
5    varies within the array and a molecule to be crystallized, the drop having a  
6    volume of less than 1 microliter;  
7       storing the array of microcrystallizations under conditions suitable  
8    for molecule crystals to form in the drops in the array; and  
9       detecting molecule crystal formation in the drops by taking images  
10   of the drops.

1    2.    The method according to claim 1 wherein taking images of the drops  
2    comprises taking a single image of each drop.

1    3.    The method according to claim 1 wherein taking images of the drops  
2    is performed without having to adjust a focus of an optical system taking the  
3    images.

1    4.    The method according to claim 3 wherein taking images of the drops  
2    comprises taking a single image of each drop.

1    5.    The method according to claim 1 wherein the molecule is a  
2    macromolecule.

- 1       6.       The method according to claim 1 wherein the molecule is a protein.
- 1       7.       The method according to claim 1 wherein the macromolecule has a  
2       molecular weight of at least 500 daltons.
- 1       8.       The method according to claim 1 wherein the drop has a volume of  
2       less than about 750 nL.
- 1       9.       The method according to claim 1 wherein the drop has a volume of  
2       less than about 500 nL.
- 1       10.      The method according to claim 1 wherein the drop has a volume of  
2       less than about 250 nL.
- 1       11.      The method according to claim 1 wherein the drop has a volume of  
2       between about 1 nL - 750 nL.
- 1       12.      The method according to claim 1 wherein the drop has a volume of  
2       between about 1 nL - 500 nL.
- 1       13.      The method according to claim 1 wherein the drop has a volume of  
2       between about 1 nL - 250 nL.
- 1       14.      The method according to claim 1 wherein each microcrystallization  
2               further includes a volume of mother liquor solution separate from  
3               the drop, the mother liquor solution contained in the volume having  
4               the same

5 composition as the mother liquor solution contained in the drop, the volume  
6 comprising less than about 500 mL of the mother liquor solution.

1 15. The method according to claim 1 wherein each microcrystallization  
2 further includes a volume of mother liquor solution separate from the drop,  
3 the mother liquor solution contained in the volume having the same  
4 composition as the mother liquor solution contained in the drop, the volume  
5 comprising less than about 250 mL of the mother liquor solution.

1 16. The method according to claim 1 wherein the mother liquor  
2 solutions have at least 4 components which are varied within the array.

1 17. The method according to claim 1 wherein the mother liquor  
2 solutions have at least 5 components which are varied within the array.

1 18. The method according to claim 1 wherein the array includes greater  
2 than 96 microcrystallizations.

1 19. The method according to claim 1 wherein the array includes greater  
2 than 192 microcrystallizations.

1 20. The method according to claim 1 wherein forming the array of  
2 microcrystallizations includes using greater than 48 stock solutions to form  
3 the mother liquor solutions used in the array.

1    21.    The method according to claim 1 wherein forming the array of  
2    microcrystallizations includes using greater than 96 stock solutions to form  
3    the mother liquor solutions used in the array.

1    22.    The method according to claim 1 wherein forming the array of  
2    microcrystallizations includes using greater than 192 stock solutions to form  
3    the mother liquor solutions used in the array.

1    23.    The method according to claim 1 wherein forming the array of  
2    microcrystallizations includes forming the drops within a volume range of  
3    less than about 25 nL.

1    24.    The method according to claim 1 wherein forming the array of  
2    microcrystallizations includes forming the drops within a volume range of  
3    less than about 20 nL.

1    25.    The method according to claim 1 wherein forming the array of  
2    microcrystallizations includes forming the drops within a volume range of  
3    less than about 15 nL.

1    26.    A method for performing array microcrystallizations to determine  
2    suitable crystallization conditions for a molecule, the method comprising:  
3                 forming an array of microcrystallizations, each microcrystallization  
4                 comprising a hanging drop comprising a mother liquor solution whose  
5                 composition varies within the array and a molecule to be crystallized, the  
6                 drop having a volume of less than 1 microliter;  
7                 storing the array of microcrystallizations under conditions suitable

8 for molecule crystals to form in the drops in the array; and  
9           detecting molecule crystal formation in the drops by taking images  
10 of the drops.

1 27. The method according to claim 26 wherein taking images of the  
2 drops comprises taking a single image of each drop.

1 28. The method according to claim 26 wherein taking images of the  
2 drops is performed without having to adjust a focus of an optical system  
3 taking the images.

1 29. The method according to claim 28 wherein taking images of the  
2 drops comprises taking a single image of each drop.

1 30. A method for performing array microcrystallizations to determine  
2 suitable crystallization conditions for a molecule, the method comprising:  
3           forming an array of microcrystallizations, each microcrystallization  
4 comprising a sitting drop comprising a mother liquor solution whose  
5 composition varies within the array and a molecule to be crystallized, the  
6 drop having a volume of less than 1 microliter;  
7           storing the array of microcrystallizations under conditions suitable  
8 for molecule crystals to form in the drops in the array; and  
9           detecting molecule crystal formation in the drops by taking images  
10 of the drops.

1 31. The method according to claim 30 wherein taking images of the  
2 drops comprises taking a single image of each drop.

1   32.   The method according to claim 30 wherein taking images of the  
2   drops is performed without having to adjust a focus of an optical system  
3   taking the images.

1   33.   The method according to claim 32 wherein taking images of the  
2   drops comprises taking a single image of each drop.

1   34.   A method for performing array microcrystallizations to determine  
2   suitable crystallization conditions for a molecule, the method comprising:  
3         forming an array of microcrystallizations, each microcrystallization  
4         comprising a microcrystallization volume comprising a mother liquor  
5         solution whose composition varies within the array and a molecule to be  
6         crystallized, the microcrystallization volume having a volume of less than 1  
7         microliter;  
8         storing the array of microcrystallizations under conditions suitable  
9         for molecule crystals to form in the microcrystallization volumes; and  
10         detecting molecule crystal formation in the microcrystallization  
11         volumes by taking images of the microcrystallization volumes.

1   35.   The method according to claim 34 wherein taking images of the  
2   microcrystallization volumes comprises taking a single image of each  
3   microcrystallization volume.

1   36.   The method according to claim 34 wherein taking images of the  
2   microcrystallization volumes is performed without having to adjust a focus  
3   of an optical system taking the images.

1    37.    The method according to claim 36 wherein taking images of the  
2    microcrystallization volumes comprises taking a single image of each  
3    microcrystallization volume.

1    38.    The method according to claim 37 wherein the molecule is a  
2    macromolecule.

1    39.    The method according to claim 37 wherein the molecule is a  
2    protein.

1    40.    The method according to claim 37 wherein the macromolecule has a  
2    molecular weight of at least 500 daltons.

1    41.    The method according to claim 37 wherein the microcrystallization  
2    volume has a volume of less than about 750 nL.

1    42.    The method according to claim 37 wherein the microcrystallization  
2    volume has a volume of less than about 500 nL.

1    43.    The method according to claim 37 wherein the microcrystallization  
2    volume has a volume of less than about 250 nL.

1    44.    The method according to claim 37 wherein the microcrystallization  
2    volume has a volume of between about 1 nL - 750 nL.

1    45.    The method according to claim 37 wherein the microcrystallization  
2    volume has a volume of between about 1 nL - 500 nL.

1    46.    The method according to claim 37 wherein the microcrystallization  
2    volume has a volume of between about 1 nL - 250 nL.

1    47.    The method according to claim 37 wherein the mother liquor  
2    solutions have at least 4 components which are varied within the array.

1    48.    The method according to claim 37 wherein the mother liquor  
2    solutions have at least 5 components which are varied within the array.

1    49.    The method according to claim 37 wherein the array includes  
2    greater than 96 microcrystallizations.

1    50.    The method according to claim 37 wherein the array includes  
2    greater than 192 microcrystallizations.

1    51.    The method according to claim 37 wherein forming the array of  
2    microcrystallizations includes using greater than 48 stock solutions to form  
3    the mother liquor solutions used in the array.

1    52.    The method according to claim 37 wherein forming the array of  
2    microcrystallizations includes using greater than 96 stock solutions to form  
3    the mother liquor solutions used in the array.

1    53.    The method according to claim 37 wherein forming the array of  
2    microcrystallizations includes using greater than 192 stock solutions to form  
3    the mother liquor solutions used in the array.

1    54.    The method according to claim 37 wherein forming the array of  
2    microcrystallizations includes forming the microcrystallization volumes  
3    within a volume range of less than about 25 nL.

1    55.    The method according to claim 37 wherein forming the array of  
2    microcrystallizations includes forming the microcrystallization volumes  
3    within a volume range of less than about 20 nL.

1    56.    The method according to claim 37 wherein forming the array of  
2    microcrystallizations includes forming the microcrystallization volumes  
3    within a volume range of less than about 15 nL.